

REMARKS

Applicants respectfully request further examination and reconsideration in view of the arguments set forth fully below. In the Office Action mailed April 4, 2006, claims 1-20 have been rejected. In response, the Applicants have submitted the following remarks. Accordingly, claims 1-20 are still pending. Favorable reconsideration is respectfully requested in view of the remarks below.

Rejections Under 35 U.S.C. §102

Claims 1, 2, 7, 11, 15-17 and 20 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,802,491 to Cohen et al. (hereinafter Cohen). The Applicants respectfully disagree with this rejection.

Cohen teaches a method and apparatus for assessing myocardial electrical stability based on the derivation of an alternating ECG morphology index from a series of heartbeats (Cohen, abstract). The Cohen reference teaches an ECG waveform that is digitized at a plurality of sample points for each of a series of beats, thereby constructing sample point matrices, and the alternating energy at each of the sample points for the series of beats is computed. In essence, the Cohen reference teaches a method and system for assessing myocardial electrical stability using alternans ECG methods. In essence, the Cohen reference divides an ECG electrical signal into odd and even beats, and measures the change between the beats in order to reach its assessment. Within the Office Action, it is stated that the Cohen reference teaches using at least one morphology shape descriptor as is taught and claimed in the present invention. The Office Action cites the teachings of "alternating energy" as teaching using at least one morphology shape descriptor. However, it will be shown in the discussion below that the morphology shape descriptor of the present invention is much different than the alternans "alternating energy" ECG analysis of Cohen.

In contrast to the teachings of Cohen, the method and apparatus for detecting cardiac repolarization abnormality of the present invention includes using at least one morphology shape descriptor to determine a total quantity of values representing a total quantity of representative beats. Referring to page 4, paragraph 18-page 6, paragraph 20 of the present invention, the morphology shape descriptor determines a quantity of values representing the

representative beats using at least one morphology feature of a curve formed by a data set corresponding to the representative beat. As is taught on page 4, paragraph 19 of the present invention, the dataset can directly correspond to a representative beat, or can indirectly correspond to the representative beat, and the morphology feature can include a number of different features such as a maximum morphology feature, a minimum morphology feature, an area morphology feature, an amplitude morphology feature, a slope morphology feature, a time interval morphology feature, a ratio morphology feature, or any combination of those features above. In other words, the morphology shape descriptor as described and claimed in the present invention does not practice alternans ECG analysis using odd and even beats as described in Cohen. Following, the citation of "alternating energy" from Cohen to show a teaching of at least one morphology shape descriptor in Cohen is incorrect. For at least these reasons, the Applicants respectfully submit that Cohen does not teach using at least one morphology shaped descriptor to determine a total quantity of values representing the total quantity of representative beats.

The independent claim 1 is directed to a method of detecting a method of cardiac repolarization abnormality using at least one electrocardiogram signal comprising deriving a total quantity of representative beats of the at least one electrocardiogram signal, using at least one morphology shape descriptor to determine a total quantity of values representing the total quantity of representative beats, and using data to corresponding to at least some of the total quantity of values to assess cardiac repolarization abnormality. As discussed above, Cohen does not teach using the at least one morphology shape descriptor to determine a total quantity of values representing the total quantity of representative beats. For at least these reasons, the independent claim 1 is allowable over the teachings of Cohen.

Claims 2, 7, 11 and 15 are dependent upon the independent claim 1. As discussed above, the independent claim 1 is allowable over the teachings of Cohen. Accordingly, claims 2, 7, 11 and 15 are also allowable as being dependent upon an allowable base claim.

The independent claim 16 is directed to a method of detecting cardiac repolarization abnormality using at least one electrocardiogram signal comprising deriving a total quantity of representative beats of the at least one electrocardiogram signal, using at least one morphology shaped descriptor to determine a total quantity of value representing the total

quantity of representative beats, generating a template using at least one value corresponding to at least one of the representative beats, comparing the template and at least one value corresponding to at least one other of the representative beats, and using the comparison to determine whether cardiac repolarization abnormality exists. As described above, Cohen does not teach using at least one morphology shape descriptor to determine a total quantity of values representing the total quantity of representative beats. For at least these reasons, the independent claim 16 is allowable over the teachings of Cohen.

Claim 17 is dependent upon the independent claim 16. As discussed above, the independent claim 16 is allowable over the teachings of Cohen. Accordingly, claim 17 is also allowable as being dependent upon an allowable base claim.

The independent claim 20 is directed to a device for detecting cardiac repolarization abnormality using at least one electrocardiogram signal comprising, means for generating a total quantity of representative beats of the at least one electrocardiogram signal, means for using at least one morphology shaped descriptor to determine a total quantity of values representing the total quantity of representative beats, and means for using data corresponding to at least some of the total quantity of values to assess cardiac repolarization abnormality. As described above, Cohen does not teach means for using at least one morphology shaped descriptor to determine the total quantity of values representing the total quantity of representative beats. For at least these reasons, the independent claim 20 is allowable over the teachings of Cohen.

Rejections Under 35 U.S.C. §103

Claims 3-6 and 12-14 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Cohen in view of U.S. Patent No. 6,983,183 to Thiagarajan et al. (hereinafter Thiagarajan). Claims 3-6 and 12-14 are dependent upon the independent claim 1. As discussed above, the independent claim 1 is allowable over the teachings of Cohen. Accordingly, claims 3-5 and 12-14 are also allowable as being dependent upon an allowable base claim.

Claims 8 and 18 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Cohen in view of U.S. Patent No. 5,713,367 to Arnold et al. (hereinafter Arnold).


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Claims 8 and 18 are dependent upon the independent claims 1 and 16. As discussed above, the independent claims 1 and 16 are allowable over the teachings of Cohen. Accordingly claims 8 and 8 are also allowable as being dependent upon an allowable base claim. Claims 9-10 and 19 are rejected under 35 U.S.C. §103(a) as being upatentable over Cohen and Arnold as applied to claims 8 and 18 above, and in further view of U.S. Patent No. 6,847,840 to Depasquale et al. (hereinafter Depasquale). Claims 9-10 and 19 are dependent upon the independent claims 1 and 16. As discussed above, the independent claims 1 and 16 are allowable over the teachings of Cohen. Accordingly, claims 9-10 and 19 are also allowable as being dependent upon an allowable base claim.

For these reasons, Applicants respectfully submit that all of the claims are now in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, they are encouraged to call the undersigned at 414-271-7590 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,

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